

What is claimed is:

1. A system for code division packet switching at an originating mobile subscriber terminal, said originating mobile subscriber terminal being located within a microport cell of a terrestrial wireless network at a given instant of time, where said network interfaces with an originating access radio port, comprising:

means for spreading a transmission signal by a PN-code assigned to an access radio port;

means for inserting an identifier of a few bits for identifying a user;

means for modulating said PN-code spread transmission signal;

means for forwarding said modulated PN-code spread transmission signal and marking a time origin of said forwarding of said modulated PN-code spread transmission signal;

means for receiving an acknowledgment, within a time-out period, from said originating access radio port, said acknowledgment comprising an assignment of an orthogonal code to said originating mobile subscriber terminal and a timing adjustment;

means for spreading a payload data signal by said assigned orthogonal code;

means for spreading the orthogonal spread payload data signal by the PN-code thereby associating the user with payload data;

means for modulating said twice-spread payload data signal;

means for adjusting a transmission time by said timing adjustment received from said originating access radio port; and

means for forwarding said modulated twice-spread payload data signal to said originating access radio port.

2. The system according to claim 1, wherein if no acknowledgment is received from said originating access radio port within said time-out period, said modulated PN-code spread transmission signal is forwarded again marking the time origin of said forwarding again.

3. The system according to claim 1, wherein said first means for spreading by said PN-code forms a preamble, which is prepended to a packet.

4. The system according to claim 1, wherein said orthogonal code is a Hadamard code.

5. A system for code division packet switching at an originating access radio port of a terrestrial wireless network, where said originating access radio port interfaces with a plurality of originating mobile subscriber terminals located within a microport cell of said terrestrial wireless network, comprising:

means for demodulating a transmission signal;

means for acquiring a preamble from said transmission signal;

means for acquiring a header from said transmission signal;

means for forwarding an acknowledgment to one of said plurality of said originating mobile subscriber terminals, said acknowledgment comprising an assignment of an orthogonal code to said one of said plurality of originating mobile subscriber terminals and a timing adjustment;

means for receiving a further transmission signal comprising payload data; and
means for despreading said further transmission signal by both said assigned
orthogonal code and a PN-code.

6. The system according to claim 5, further comprising:

means for creating an ATM packet; and
means for forwarding said ATM packet through said network via an access node.

7. The system according to claim 5, wherein said orthogonal code sequence
is a Hadamard code.

8. The system according to claim 6, further comprising means for releasing
said assignment of said orthogonal code.

9. A system for code division packet switching at an originating mobile
subscriber terminal, said originating mobile subscriber terminal being located within a
microport cell of a terrestrial wireless network at a given instant in time, where said
network interfaces with an originating access radio port, comprising:

means for spreading a transmission signal by a PN-code assigned to an access
radio port;

means for inserting an identifier of a few bits for identifying a user;

means for modulating said PN-code spread transmission signal;

means for forwarding said modulated PN-code spread transmission signal and marking a time origin of said forwarding of said modulated PN-code spread transmission signal;

means for receiving an acknowledgment, within a time-out period, from said originating access radio port, said acknowledgment comprising an assignment of an orthogonal code to said originating mobile subscriber terminal and a timing adjustment;

means for spreading a payload data signal and an end of packet flag by said assigned orthogonal code;

means for spreading the orthogonal spread payload data signal and said end of packet flag by the PN-code thereby associating the user with payload data;

means for modulating said twice-spread payload data signal and said end of packet flag;

means for adjusting a transmission time by said timing adjustment received from said originating access radio port; and

means for forwarding said modulated twice-spread payload data signal and said end of packet flag to said originating access radio port.

10. The system according to claim 9, wherein if no acknowledgment is received from said originating access radio port within said timeout period, said modulated PN-code spread transmission signal is forwarded again marking the time origin of said forwarding again.

11. A system for code division packet switching at a destination access radio port of a terrestrial wireless network, where said destination access radio port interfaces with a plurality of destination mobile subscriber terminals located within a microport cell of said terrestrial wireless network, comprising:

means for transmitting a paging message to one of said plurality of destination mobile subscriber terminals over a paging channel indicating that there is payload data for said one of said plurality of destination mobile subscriber terminals;

means for receiving an acknowledgment from said one of said plurality of destination mobile subscriber terminals;

means for spreading said payload data extracted from an ATM packet with a uniquely assigned orthogonal code; and

means for transmitting said spread payload data to said one of said plurality of destination mobile subscriber terminals.

12. The system according to claim 11, further comprising:

means for waiting for a time-out period for a negative acknowledgment; and

means for releasing said uniquely assigned orthogonal code if no negative acknowledgment is received within said timeout period.

13. A system for code division packet switching at a destination mobile subscriber terminal, said destination mobile subscriber terminal being located within a microport cell of a terrestrial wireless network at a given instant in time, where said network interfaces with a destination access radio port, comprising:

means for monitoring a paging channel for paging messages indicating that there is payload data for said destination mobile subscriber terminal;

means for receiving a paging message via said paging channel;

means for transmitting an acknowledgment to said destination access radio port;

means for receiving twice-spread payload data;

means for despreading said payload data using a uniquely assigned orthogonal code and a PN-code; and

means for decoding said despread payload data.

14. The system according to claim 13, further comprising means for presenting said payload data to a user.

15. The system according to claim 13, wherein said means for monitoring is accomplished by monitoring said paging channel using an arbitrary orthogonal code.

16. The system according to claim 13, wherein said acknowledgment comprises an assignment of a unique orthogonal code.

17. The system according to claim 13, further comprising means for switching, by said destination mobile subscriber terminal, to said uniquely assigned orthogonal code before despreading said twice-spread payload data.

18. The system according to claim 5, wherein said network is an ATM network.

19. A system for code division packet-switching at a destination access radio port of a terrestrial wireless network, where said destination access radio port interfaces with a plurality of destination mobile subscriber terminals located within a microport cell, comprising:

means for receiving a packet switched transmission signal from an access node via a network;

means for assigning a unique orthogonal code to one of said plurality of said destination mobile subscriber terminals;

means for spreading payload data destined for said one of said plurality of destination mobile subscriber terminals using both said uniquely assigned orthogonal code and a PN-code;

means for forwarding a paging message via a paging channel to said one of said plurality of said destination mobile subscriber terminals indicating that there is payload data destined for said one of said plurality of said destination mobile subscriber terminals;

means for receiving an acknowledgment from said one of said plurality of said destination mobile subscriber terminals;

means for modulating said twice-spread payload data; and

means for transmitting said twice-spread payload data over air to said one of said plurality of said destination mobile subscriber terminals.

20. A system for code division packet switching at a destination access radio port of a terrestrial wireless network, where said destination access radio port interfaces with a plurality of destination mobile subscriber terminals located within a microport cell, comprising:

- means for acquiring a preamble and a header, which has a PN-code;
- means for processing said PN-code to insure synchronization;
- means for sending an acknowledgment; and
- means for receiving payload data.

21. The system according to claim 20, wherein said preamble is acquired using a serial/parallel acquisition circuit.

22. The system according to claim 21, wherein said synchronization is made to a standard reference time maintained by said destination access radio port.

23. The system according to claim 20, wherein said payload data are received by despreading by a unique orthogonal code and said PN-code.

24. A system for code division packet switching used for interfacing a terrestrial wireless network with a packet-switched network, where said wireless network interfaces with a plurality of access radio ports, each of said access radio ports interfacing to a plurality of mobile subscriber terminals, comprising:

means for spreading, by said originating mobile subscriber terminal, a transmission signal by a PN-code assigned to an intended receiving port;

means for inserting, by said originating mobile subscriber terminal, an identifier of a few bits for identifying a user;

means for modulating, by said originating mobile subscriber terminal, said PN-code spread transmission signal;

means for forwarding, by said originating mobile subscriber terminal, said modulated PN-code spread transmission signal and marking the time origin of said forwarding;

means for demodulating, by said originating access radio port, said modulated PN-code spread transmission signal;

means for acquiring, by said originating access radio port, a preamble from said transmitted signal;

means for despreading, by said originating access radio port, a header from said transmitted signal;

means for forwarding, by said originating access radio port, an acknowledgment to one of said plurality of said originating mobile subscriber terminals, said acknowledgment comprising an assignment of an orthogonal code to said one of said plurality of originating mobile subscriber terminals and a timing adjustment;

means for receiving, by said originating mobile subscriber terminal, said acknowledgment, within a time-out period, from said originating access radio port;

means for spreading, by said originating mobile subscriber terminal, a payload data signal by said assigned orthogonal code;

means for spreading, by said originating mobile subscriber terminal, the orthogonal spread payload data signal by the PN-code associating the user with payload data;

means for modulating, by said originating mobile subscriber terminal, said twice-spread payload data signal;

means for adjusting, by said originating mobile subscriber terminal, a transmission time by said timing adjustment received from said originating radio access port;

means for forwarding, by said originating mobile subscriber terminal, said modulated twice-spread payload data signal to said originating access radio port;

means for receiving, by said originating access radio port, a further transmission signal comprising payload data;

means for despreading said further transmission signal by both said assigned orthogonal code and said PN-code;

means for monitoring, by a destination mobile subscriber terminal, a paging channel for paging messages indicating that there is payload data for said destination mobile subscriber terminal;

means for transmitting, by a destination access radio port, said paging message to a destination mobile subscriber terminal over said paging channel indicating that there is payload data for one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said paging message via said paging channel;

means for transmitting, by said destination mobile subscriber terminal, an acknowledgment to said destination access radio port;

means for receiving, by said destination access radio port, said acknowledgment from said one of said plurality of destination mobile subscriber terminals;

means for spreading, by said destination access radio port, said payload data extracted from an ATM packet with a uniquely assigned orthogonal code and with said PN-code;

means for transmitting, by said destination access radio port, said twice-spread payload data to said one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said twice-spread payload data;

means for despreading, by said destination mobile subscriber terminal, said payload data using said uniquely assigned orthogonal code and said PN-code; and

means for decoding, by said destination mobile subscriber terminal, said despread payload data.

25. The system according to claim 24, further comprising the step of presenting, by said destination mobile subscriber terminal, said payload data to a user.

26. A system for code division packet switching used for interfacing a terrestrial wireless network with a packet-switched network, where said wireless network interfaces with a plurality of access radio ports, each of said access radio ports interfacing to a plurality of mobile subscriber terminals, comprising:

means for spreading, by said originating mobile subscriber terminal, a transmission signal by a PN-code assigned to an intended receiving port;

means for inserting, by said originating mobile subscriber terminal, an identifier of a few bits for identifying a user;

means for modulating, by said originating mobile subscriber terminal, said PN-code spread transmission signal;

means for forwarding, by said originating mobile subscriber terminal, said modulated PN-code spread transmission signal and marking the time origin of said forwarding;

means for demodulating, by said originating access radio port, said modulated PN-code spread transmission signal;

means for acquiring, by said originating access radio port, a preamble from said transmitted signal;

means for despreading, by said originating access radio port, a header from said transmitted signal;

means for forwarding, by said originating access radio port, an acknowledgment to one of said plurality of said originating mobile subscriber terminals, said acknowledgment comprising an assignment of an orthogonal code to said one of said plurality of originating mobile subscriber terminals and a timing adjustment;

means for receiving, by said originating mobile subscriber terminal, said acknowledgment, within a time-out period, from said originating access radio port;

means for spreading, by said originating mobile subscriber terminal, a payload data signal by said assigned orthogonal code;

means for spreading, by said originating mobile subscriber terminal, the orthogonal spread payload data signal by the PN-code associating the user with payload data;

means for modulating, by said originating mobile subscriber terminal, said twice-spread payload data signal;

means for adjusting, by said originating mobile subscriber terminal, a transmission time by said timing adjustment received from said originating radio access port;

means for forwarding, by said originating mobile subscriber terminal, said modulated twice-spread payload data signal to said originating access radio port;

means for receiving, by said originating access radio port, a further transmission signal comprising payload data;

means for despreading, by said originating access radio port, said further transmission signal by both said assigned orthogonal code and said PN-code;

means for monitoring, by a destination mobile subscriber terminal, a paging channel for paging messages indicating that there is payload data for said destination mobile subscriber terminal;

means for receiving, by said destination radio access port, said packet switch transmission signal from an access node via a network;

means for assigning, by said destination access radio port, a unique orthogonal code to one of said plurality of said destination mobile subscriber terminals;

means for spreading, by said destination access radio port, payload data destined for said one of said plurality of destination mobile subscriber terminals using both said uniquely assigned orthogonal code and a PN-code;

means for transmitting, by a destination access radio port, said paging message to said one of said plurality of said destination mobile subscriber terminals over said paging channel indicating that there is payload data for said one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said paging message via said paging channel;

means for transmitting, by said destination mobile subscriber terminal, an acknowledgment to said destination access radio port;

means for receiving, by said destination access radio port, said acknowledgment from said one of said plurality of destination mobile subscriber terminals;

means for spreading, by said destination access radio port, said payload data extracted from an ATM packet with a uniquely assigned orthogonal code and with said PN-code;

means for modulating, by said destination access radio port, said twice-spread payload data;

means for transmitting, by said destination access radio port, said twice-spread payload data over air to said one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said twice-spread payload data;

means for despreading, by said destination mobile subscriber terminal, said payload data using said uniquely assigned orthogonal code and said PN-code; and

means for decoding, by said destination mobile subscriber terminal, said despread payload data.

27. The system according to claim 26, further comprising means for presenting, by said destination mobile subscriber terminal, said payload data to a user.

28. The system according to claim 5, wherein said first means for spreading by said PN-code forms a preamble, which is prepended to a packet.

29. The system according to claim 9, wherein said first means for spreading by said PN-code forms a preamble, which is prepended to a packet.

30. The system according to claim 24, wherein said first means for spreading by said PN-code forms a preamble, which is prepended to a packet.

31. The system according to claim 26, wherein said first means for spreading by said PN-code forms a preamble, which is prepended to a packet.

32. A system for code division packet switching at an originating mobile subscriber terminal, said originating mobile subscriber terminal being located within a microport cell of a terrestrial wireless network at a given instant of time, where said network interfaces with an originating access radio port, comprising:

means for spreading a preamble by a PN-code assigned to a access radio port;

means for inserting an identifier of a few bits for identifying a user;

means for modulating said PN-code spread transmission signal;

means for forwarding said modulated PN-code spread transmission signal and marking a time origin of said forwarding of said modulated PN-code spread transmission signal;

means for receiving an acknowledgment, within a time-out period, from said originating access radio port, said acknowledgment comprising an assignment of an orthogonal code to said originating mobile subscriber terminal and a timing adjustment;

means for spreading a payload data signal by said assigned orthogonal code;

means for spreading the orthogonal spread payload data signal by the PN-code thereby associating the user with payload data;

means for modulating said twice-spread payload data signal;

means for adjusting a transmission time by said timing adjustment received from said originating access radio port; and

means for forwarding said modulated twice-spread payload data signal to said originating access radio port.

33. The system according to claim 32, wherein said first spreading means and said second spreading means are accomplished using a spreader comprising:

a first multiplier used to spread said payload data by said assigned orthogonal code;

a second multiplier used to spread said preamble, said header and said payload data by said PN-code; and

a switch used to alternate between said first multiplier and said second multiplier thereby spreading said preamble and said header by said PN-code only and spreading said payload data by both said assigned orthogonal code and said PN-code.

34. A system for code division packet switching used for interfacing a terrestrial wireless network with a packet-switched network, where said wireless network interfaces with a plurality of access radio ports, each of said access radio ports interfacing to a plurality of mobile subscriber terminals, comprising:

means for spreading, by said originating mobile subscriber terminal, a preamble and a header signal by a PN-code assigned to an intended receiving port;

means for inserting, by said originating mobile subscriber terminal, an identifier of a few bits for identifying a user;

means for modulating, by said originating mobile subscriber terminal, said PN-code spread transmission signal;

means for forwarding, by said originating mobile subscriber terminal, said modulating PN-code spread transmission signal and marking the time origin of said forwarding;

means for demodulating, by said originating access radio port, said modulated PN-code spread transmission signal;

means for acquiring, by said originating access radio port, a preamble from said transmitted signal;

means for despreading, by said originating access radio port, a header from said transmitted signal;

means for forwarding, by said originating access radio port, an acknowledgment to one of said plurality of said originating mobile subscriber terminals, said acknowledgment comprising an assignment of an orthogonal code to said one of said plurality of originating mobile subscriber terminals and a timing adjustment;

means for receiving, by said originating mobile subscriber terminal, said acknowledgment, within a time-out period, from said originating access radio port;

means for spreading, by said originating mobile subscriber terminal, a payload data signal by said assigned orthogonal code;

means for spreading, by said originating mobile subscriber terminal, the orthogonal spread payload data signal by the PN-code associating the user with payload data;

means for modulating, by said originating mobile subscriber terminal, said twice-spread payload data signal;

means for adjusting, by said originating mobile subscriber terminal, a transmission time by said timing adjustment received from said originating access radio port;

means for forwarding, by said originating mobile subscriber terminal, said modulated twice-spread payload data signal to said originating access radio port;

means for receiving, by said originating access radio port, a further transmission signal comprising payload data;

means for despreading, by said originating access radio port, said further transmission signal by both said assigned orthogonal code and said PN-code;

means for monitoring, by a destination mobile subscriber terminal, a paging channel for paging messages indicating that there is payload data for said destination mobile subscriber terminal;

means for receiving, by said destination radio access port, said packet switch transmission signal from an access node via a network;

means for assigning, by said destination access radio port, a unique orthogonal code to one of said plurality of said destination mobile subscriber terminals;

means for spreading, by said destination access radio port, payload data destined for said one of said plurality of destination mobile subscriber terminals using both said uniquely assigned orthogonal code and a PN-code;

means for transmitting, by a destination access radio port, a paging message to said one of said plurality of said destination mobile subscriber terminals over said paging channel indicating that there is payload data for said one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said paging message via said paging channel;

means for transmitting, by said destination mobile subscriber terminal, an acknowledgment to said destination access radio port;

means for receiving, by said destination access radio port, said acknowledgment from said one of said plurality of destination mobile subscriber terminals;

means for spreading, by said destination access radio port, said payload data extracted from an ATM packet with a uniquely assigned orthogonal code and with said PN-code;

means for modulating, by said destination access radio port, said twice-spread payload data;

means for transmitting, by said destination access radio port, said twice-spread payload data over air to one of said plurality of destination mobile subscriber terminals;

means for receiving, by said destination mobile subscriber terminal, said twice-spread payload data;

means for despreading, by said destination mobile subscriber terminal, said payload data using said uniquely assigned orthogonal code and said PN-code; and

means for decoding, by said destination mobile subscriber terminal, said despread payload data.

35. The system according to claim 34, wherein said first spreading means and said second spreading means are accomplished using a spreader comprising:

a first multiplier used to spread said payload data by said assigned orthogonal code;

a second multiplier used to spread said preamble, said header and said payload data by said PN-code; and

a switch used to alternate between said first multiplier and said second multiplier thereby spreading said preamble and said header by said PN-code only and spreading said payload data by both said assigned orthogonal code and said PN-code.

36. A code division switching system used for interfacing a terrestrial wireless network with a core network, where said wireless network interfaces with a plurality of wireless terminal users, comprising:

means for spreading a transmission signal by a PN-code assigned to an intended receiving port;

means for inserting an identifier of a few bits for identifying a user;

means for spreading payload data by an orthogonal code;

means for spreading the orthogonal spread payload data signal by the PN-code identifying the user with payload data;

means for forwarding, at the originating terminal, said PN-code spread transmission signal and said twice spread payload data signal to an access radio port;

means for despreading, at an originating access radio port, the transmission signal by orthogonal code assignments to recover microport groupings and route said microport groupings accordingly;

means for translating, at the originating access radio port, the orthogonal code assignments to a packet address identifying a destination microport augmented to identify a destination access node;

means for downconverting, at the originating access radio port, to an intermediate frequency;

means for depositing, at the originating access radio port, said despread transmission signal into a packet with said packet address;

means for transmitting, from the originating access radio port, said packet to an originating access node for further transmission over a network;

means for receiving, at a destination access radio port, said packet switched transmission signal from a destination access node via a core network;

means for translating a packet address into an orthogonal code sequence;

means for resspreading said orthogonal code sequence into a transmission signal at an intermediate frequency;

means for upconverting said resspread transmission signal; and

means for transmitting said resspread upconverted transmission signal over the air to a destination terminal user.

37. A code division switching system used for interfacing a terrestrial wireless network with a core network, where said wireless network interfaces with a plurality of wireless terminal users, comprising the steps of:

means for spreading a transmission signal by a PN-code assigned to an intended receiving port;

means for inserting an identifier of a few bits for identifying a user;

means for spreading payload data by an orthogonal code;

means for spreading the orthogonal spread payload data signal by the PN-code identifying the user with payload data;

means for forwarding, at the originating terminal, said PN-code spread transmission signal and said twice spread payload data signal to an access radio port;

means for despreading, at an originating access radio port, the transmission signal by orthogonal code assignments to recover microport groupings and route said microport groupings accordingly;

means for directing the transmission signal within the same access node according to the orthogonal code assignments;

means for downconverting, at the originating access radio port, to an intermediate frequency;

means for depositing, at the originating access radio port, said despread transmission signal into a packet with said packet address;

means for transmitting, from the originating access radio port, said packet to an originating access node for further transmission over a core network;

means for receiving, at a destination access radio port, said packet switched transmission signal from a destination access node via a core network;

means for translating a packet address into an orthogonal code sequence;

means for respreading said orthogonal code sequence into a transmission signal at an intermediate frequency;

means for upconverting said resspread transmission signal; and

means for transmitting said resspread upconverted transmission signal over the air to a destination terminal user.

38. A code division switching system at an originating terminal, located at an instant of transmission within a microport cell, of a terrestrial wireless network, where said network interfaces with an access radio port, comprising:

a first spreader for spreading a transmission signal by a PN-code assigned to an intended receiving port;

a second spreader for spreading a payload data signal by an orthogonal code assigned to a receiving terminal user to which the payload data signal is directed, said payload data signal being further spread by said first spreader;

means for forwarding said PN-code spread transmission signal to an access radio port; and

means for forwarding said twice spread transmission signal to an access radio port.